

REMARKS/ARGUMENTS

Claims 1-3, 6-10, 12-18, 20, 21 and 23-25 are pending, claims 3, 10, 12, 18 and 20 having been withdrawn from consideration. By this Amendment, claims 4, 5 and 22 are cancelled without prejudice or disclaimer, and claims 1-3, 6-10, 12-17, 21 and 23-25 are amended. Support for the amendments to claims 1-3, 6-10, 12-17, 21 and 23-25 can be found, for example, in the present specification at page 3, lines 23 to 30, page 3, line 30 to page 4, line 2, and page 4, lines 4 to 7 and 15 to 16, in original claim 4, and in previously presented claims 1-3, 6-10, 12-17, 21 and 23-25. No new matter is added. In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

Withdrawn Claims

For the reasons set forth below, Applicants submit that the species presently subject to examination are allowable. Rejoinder and examination of the non-elected species are, thus, appropriate.

Rejection Under 35 U.S.C. §112, Second Paragraph

The Office Action rejects claims 1, 2, 4-9, 13-17 and 21-25 as indefinite under 35 U.S.C. §112, second paragraph. By this Amendment, claims 4, 5 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

With respect to the basis for rejection set forth in the paragraph beginning at page 3, line 4, of the Office Action, Applicants have amended claims 1, 13 and 21 to address the concern set forth in the Office Action.

With respect to the basis for rejection set forth in the paragraph beginning at page 3, line 14, of the Office Action, Applicants have amended claims 1 and 13 to address the concern set forth in the Office Action.

With respect to the basis for rejection set forth in the paragraph beginning at page 4, line 10, of the Office Action, Applicants have amended claim 13 to address the concern set forth in the Office Action.

With respect to the basis for rejection set forth in the paragraph beginning at page 5, line 3, of the Office Action, Applicants have amended claims 8, 9, 16 and 17 to address the concern set forth in the Office Action.

With respect to the basis for rejection set forth in the paragraph beginning at page 5, line 9, of the Office Action, Applicants have amended claim 21 to address the concern set forth in the Office Action.

For the foregoing reasons, claims 1, 2, 6-9, 13-17, 21 and 23-25 are definite. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Rejection Under 35 U.S.C. §112, First Paragraph

A. Written Description

The Office Action rejects claims 1, 2, 4-9, 13-17 and 21-25 under the written description requirement of 35 U.S.C. §112, first paragraph. By this Amendment, claims 4, 5 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

With respect to the basis for rejection set forth in the paragraph beginning at page 6, line 10, of the Office Action, although Applicants reserve the right to pursue broader subject matter in later applications, claims 1 and 13 are amended to address the concern set forth in the Office Action.

With respect to the basis for rejection set forth in the paragraph beginning at page 6, line 18, of the Office Action, although Applicants reserve the right to pursue broader subject matter in later applications, claim 21 is amended to address the concern set forth in the Office Action.

With respect to the basis for rejection set forth in the paragraph beginning at page 7, line 3, of the Office Action, although Applicants reserve the right to pursue broader subject matter in later applications, claims 1, 13 and 21 are amended to address the concern set forth in the Office Action.

With respect to the bases for rejection set forth in the paragraph beginning at page 8, line 6, of the Office Action, and expounded upon in the subsequent paragraphs, although Applicants reserve the right to pursue broader subject matter in later applications, claims 1, 2, 6, 7, 9, 14, 15, 17, 21, 23, 24 and 25 are amended to address the concern set forth in the Office Action.

For the foregoing reasons, claims 1, 2, 6-9, 13-17, 21 and 23-25 are fully supported by the specification as filed. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Enablement

The Office Action rejects claims 1, 2, 4-9, 13-17 and 21-25 under the enablement requirement of 35 U.S.C. §112, first paragraph. Applicants respectfully traverse the rejection.

At the outset, while Applicants reserve the right to pursue broader subject matter at a later time, it is believed that the amendments made herein in response to the rejections under 35 U.S.C. §112, second paragraph, and under the written description requirement of 35 U.S.C. §112, first paragraph, discussed above render the present rejection moot.

The Office Action appears to assert that the claims are not enabled because they are broader in scope than the Examples in the present specification. *See* Office Action, pages 12 to 13. There is simply no requirement that the claims of an application be limited to the scope of working examples to satisfy the enablement requirement. To the contrary, "for a claimed genus, representative examples together with a statement applicable to the genus as a whole will ordinarily be sufficient if one skilled in the art (in view of level of skill, state of the art and the information in the specification) would expect the claimed genus could be used in that manner without undue experimentation." *See* MPEP §2164.02. The full scope of the present claims is described in the present specification in generic terms, and examples of the claimed methods are provided.

The test of enablement is whether the present specification contains sufficient information regarding the subject matter of the claims as to enable a skilled artisan to make and use the claimed invention without undue experimentation. *See* MPEP §2164.01. The Office Action appears to speak of possibility that the claimed methods could be practiced by methods other than those employed in the examples of the present specification, (e.g., "While page 3, lines 13-page 4, line 24 indicate that parameters other than the thicknesses are being employed to control the division of the deposited material, they do not indicate that thicknesses [are] unimportant ..." – *see* Office Action, page 12), but provides no reasonable basis for concluding that undue experimentation would be required to practice the claimed methods.

For the foregoing reasons, claims 1, 2, 4-9, 13-17 and 21-25 are fully enabled by the specification as filed. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Rejections Under 35 U.S.C. §102

A. Raaijmakers

The Office Action rejects claims 1, 2, 4, 6, 7, 13-15 and 21-25 under 35 U.S.C. §102(b) over U.S. Patent Application Publication No. US 2003/0234417 to Raaijmakers et al. ("Raaijmakers"). By this Amendment, claims 4 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

Raaijmakers involves formation of a discontinuous layer of a dielectric material. *See, e.g., Raaijmakers*, paragraph [0032]. The Office Action asserts that the catalytic materials of claims 1, 13 and 21 read on the dielectric material in Raaijmakers. Each of claims 1, 13 and 21 explicitly requires that the recited catalytic material is suitable for catalyzing formation of carbon nanotubes or carbon nanofibers. There is no reasonable basis for concluding that the dielectric material in Raaijmakers is suitable for catalyzing formation of carbon nanotubes or carbon nanofibers.

As explained, claims 1, 13 and 21 are not anticipated by Raaijmakers. Claims 2, 6, 7, 14, 15 and 23-25 depend variously from claims 1, 13 and 21 and, thus, also are not anticipated by Raaijmakers. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Lee

The Office Action rejects claims 1, 2, 4, 6, 8, 9, 13, 14, 16, 17, 21, 23 and 24 under 35 U.S.C. §102(b) over WO 03/027011 to Lee ("Lee 011"). By this Amendment, claim 4 is cancelled, rendering the rejection moot as to that claim. As to the remaining claims, Applicants respectfully traverse the rejection.

The Office Action relies on Lee 011's disclosure of a method in which a disk-shaped Ni/Ti dot is formed by PE-CVD, and then annealed. *See* Office Action, page 18; Lee 011, page 11, lines 6 to 11. Upon annealing, the disk-shaped dot separates into smaller "sub-dots." *See* Lee 011, page 11, lines 11 to 14. Claims 1, 13 and 21 require that the layer of the catalytic material is formed as a film by making a sequence of deposits of the catalytic material on to the surface of the substrate or barrier layer separated by waiting phases under a vacuum or in a controlled atmosphere. Lee 011 provides no disclosure of forming a catalyst film by a making a sequence of deposits separated by waiting phases. The disk-shaped Ni/Ti dots in Lee 011, prior to annealing, are not fairly characterized as films. Further, while the deposition of disk-shaped dots in Lee 011 may involve use of a pulsable current source, the interval between pulses is not fairly characterized as a waiting phase.

As explained, claims 1, 13 and 21 are not anticipated by Lee 011. Claims 2, 6, 8, 9, 14, 16, 17, 23 and 24 depend variously from claims 1, 13 and 21 and, thus, also are not anticipated by Lee 011. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Merkulov

The Office Action rejects claims 1, 2, 4, 6, 8, 9, 13, 14, 16, 17, 21, 23 and 24 under 35 U.S.C. §102(b) over U.S. Patent Application Publication No. US 2002/0117951 to Merkulov et al. ("Merkulov"). By this Amendment, claims 4 is cancelled, rendering the rejection moot as to that claim. As to the remaining claims, Applicants respectfully traverse the rejection.

The Office Action relies on Merkulov of forming catalyst nanoparticles on a substrate by lithography. *See* Office Action, page 19; Merkulov, paragraph [0026]. Merkulov does not disclose a method in which a catalyst film is formed by a making a sequence of deposits

separated by waiting phases prior to separating the film into droplet-shaped bodies, as required in claims 1, 13 and 21.

As explained, claims 1, 13 and 21 are not anticipated by Merkulov. Claims 2, 6, 8, 9, 14, 16, 17, 23 and 24 depend variously from claims 1, 13 and 21 and, thus, also are not anticipated by Merkulov. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Rejections Under 35 U.S.C. §103

A. Lee 011 and Lee 041

The Office Action rejects claims 5, 22 and 25 under 35 U.S.C. §103(a) over Lee 011 in view of EP 1 061 041 to Lee et al. ("Lee 041"). By this Amendment, claims 5 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

For the reasons discussed above, Lee 011 does not disclose or suggest each and every feature of claims 13. Lee 041 does not remedy the deficiencies of Lee 011. Lee 041 is cited for its alleged disclosure of particular barrier layers. *See* Office Action, page 20. However, Lee 041, like Lee 011, fails to disclose or suggest forming a catalyst film by a making a sequence of deposits separated by waiting phases. In particular, there is no disclosure in Lee 041 of employing waiting phases during formation of the metal catalyst film 52. *See, e.g., Lee 041*, paragraph [0031]. Accordingly the combination of references fails to disclose or suggest each and every feature of claim 13.

As explained, claim 13 would not have been rendered obvious by Lee 011 and Lee 041. Claim 25 depends from claim 13 and, thus, also would not have been rendered obvious by Lee 011 and Lee 041. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Merkulov and Lee 041

The Office Action rejects claims 5, 22 and 25 under 35 U.S.C. §103(a) over Merkulov in view of Lee 041. By this Amendment, claims 5 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

For the reasons discussed above, Merkulov does not disclose or suggest each and every feature of claim 13. Lee 041 does not remedy the deficiencies of Merkulov. Lee 041 is cited for its alleged disclosure of particular barrier layers. See Office Action, page 20. However, Lee 041, like Merkulov, fails to disclose or suggest a method in which a catalyst film is formed by a making a sequence of deposits separated by waiting phases prior to separating the film into droplet-shaped bodies. Accordingly the combination of references fails to disclose or suggest each and every feature of claim 13.

As explained, claim 13 would not have been rendered obvious by Merkulov and Lee 041. Claim 25 depends from claim 13 and, thus, also would not have been rendered obvious by Merkulov and Lee 041. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Lee 011 and Choi

The Office Action rejects claims 7 and 15 under 35 U.S.C. §103(a) over Lee 011 in view of U.S. Patent No. 6,538,367 to Choi et al. ("Choi"). Applicants respectfully traverse the rejection.

For the reasons discussed above, Lee 011 does not disclose or suggest each and every feature of claims 1 and 13. Choi does not remedy the deficiencies of Lee 011. Choi is cited for its alleged disclosure of forming catalyst particles on a substrate under partial pressure of

oxygen. *See* Office Action, pages 21 to 22. However, Choi, like Lee 011 fails to disclose or suggest forming a catalyst film by a making a sequence of deposits separated by waiting phases. Accordingly the combination of references fails to disclose or suggest each and every feature of claims 1 and 13.

As explained, claims 1 and 13 would not have been rendered obvious by Lee 011 and Choi 041. Claims 7 and 15 depend from claims 1 and 13, respectively, and, thus, also would not have been rendered obvious by Lee 011 and Choi. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

D. Merkulov and Choi

The Office Action rejects claims 7 and 15 under 35 U.S.C. §103(a) over Merkulov in view of Choi. Applicants respectfully traverse the rejection.

For the reasons discussed above, Merkulov does not disclose or suggest each and every feature of claims 1 and 13. Choi does not remedy the deficiencies of Merkulov. Choi is cited for its alleged disclosure of forming catalyst particles on a substrate under partial pressure of oxygen. *See* Office Action, pages 21 to 22. However, Choi, like Merkulov fails to disclose or suggest a method in which a catalyst film is formed by a making a sequence of deposits separated by waiting phases prior to separating the film into droplet-shaped bodies. Accordingly the combination of references fails to disclose or suggest each and every feature of claims 1 and 13.

As explained, claims 1 and 13 would not have been rendered obvious by Merkulov and Choi 041. Claims 7 and 15 depend from claims 1 and 13, respectively, and, thus, also would not have been rendered obvious by Merkulov and Choi. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Double Patenting

A. 284 Application

The Office Action provisionally rejects claims 1, 2, 4-9, 13-17 and 21-25 under the judicially created doctrine of obviousness-type double patenting over claims 14-25 of U.S. Patent Application No. 10/546,284 in view of Lee 011 or Gao, J.S., et al., "Plasma breaking of thin films into nano-sized catalysts for carbon nanotube synthesis," Materials Science and Engineering A352 (2003) 308-313 ("Gao"). By this Amendment, claims 4, 5 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

Neither the claims of the 284 application, Lee 011 nor Gao recite or suggest a process in which a layer of a catalytic material is formed as a film by making a sequence of deposits of the catalytic material on to a surface of a substrate or barrier layer separated by waiting phases under a vacuum or in a controlled atmosphere, prior to separating the catalytic layer into droplet-shaped bodies, as required in claims 1, 13 and 21. Accordingly, the combination of references fails to suggest each and every feature of the respective claims.

As explained, the claims of the 284 application, Lee 011 and Gao do not render claims 1, 13 and 21 obvious. Claims 2, 6-9, 14-17 and 23-25 depend variously from claims 1, 13 and 21 and, thus, also are not rendered obvious by the claims of the 284 application, Lee 011 and Gao. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. 547 Patent

The Office Action rejects claims 1, 2, 4-6, 8, 9, 13, 14, 16, 17 and 21-25 under the judicially created doctrine of obviousness-type double patenting over claims 1-21 of U.S. Patent No. 7,544,547 in view of Lee 011, Gao and/or Lee 041. By this Amendment, claims

4, 5 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

Neither the claims of the 547 patent, Lee 011, Gao nor Lee 041 recite or suggest a process in which a layer of a catalytic material is formed as a film by making a sequence of deposits of the catalytic material on to a surface of a substrate or barrier layer separated by waiting phases under a vacuum or in a controlled atmosphere, prior to separating the catalytic layer into droplet-shaped bodies, as required in claims 1, 13 and 21. Accordingly, the combination of references fails to suggest each and every feature of the respective claims.

As explained, the claims of the 547 patent, Lee 011, Gao and Lee 041 do not render claims 1, 13 and 21 obvious. Claims 2, 6, 8, 9, 14, 16, 17 and 23-25 depend variously from claims 1, 13 and 21 and, thus, also are not rendered obvious by the claims of the 547 patent, Lee 011, Gao and Lee 041. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. 238 Application

The Office Action provisionally rejects claims 1, 2, 4-9, 13-17 and 21-25 under the judicially created doctrine of obviousness-type double patenting over claims 25-42 of U.S. Patent Application No. 11/915,238 in view of Lee 011, Gao and/or Lee 041. By this Amendment, claims 4, 5 and 22 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

Neither the claims of the 238 application, Lee 011, Gao nor Lee 041 recite or suggest a process in which a layer of a catalytic material is formed as a film by making a sequence of deposits of a catalytic material on to a surface of the substrate or barrier layer separated by waiting phases under a vacuum or in a controlled atmosphere, prior to separating the catalytic

layer into droplet-shaped bodies, as required in claims 1, 13 and 21. Accordingly, the combination of references fails to suggest each and every feature of the respective claims.

As explained, the claims of the 238 application, Lee 011, Gao and Lee 041 do not render claims 1, 13 and 21 obvious. Claims 2, 6-9, 14-17 and 23-25 depend variously from claims 1, 13 and 21 and, thus, also are not rendered obvious by the claims of the 238 application, Lee 011, Gao and Lee 041. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Rejections Under 35 U.S.C. §102/§103

The Office Action rejects claims 1, 2, 6-8, 21, 23 and 24 under 35 U.S.C. §102(e), or in the alternative under 35 U.S.C. §103(a), over U.S. Patent Application Publication No. US 2005/0000318 to Keller et al. ("Keller"). Applicants respectfully traverse the rejection.

Keller discloses a method in which a layer of a composition including a metallic compound and an organic compound is deposited on a substrate and then the organic compound is driven off to leave nanoparticles. *See, e.g., Keller*, Abstract, paragraph [0071]. However, Keller does not disclose or suggest a method in which a layer of a catalytic material is formed on a surface of a substrate or a barrier layer that has a surface tension lower than a surface tension of the layer of the catalytic material when the layer of the catalytic material is formed on the surface of the substrate. Further, Keller does not disclose or suggest a method in which a layer of a catalytic material is formed on a surface of a substrate that does not interact with the layer of the catalytic material when the layer of the catalytic material is formed on the surface of the substrate. Accordingly, Keller does not disclose or suggest each and every feature of claims 1, 13 and 21.

As explained, claims 1, 13 and 21 are not anticipated by and would not have been rendered obvious by Keller. Claims 2, 6-8, 23 and 24 depend variously from claims 1, 13

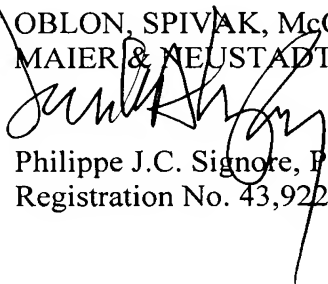
and 21 and, thus, also are not anticipated by and would not have been rendered obvious by Keller. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion

For the foregoing reasons, Applicants submit that claims 1-3, 6-10, 12-18, 20, 21 and 23-25 are in condition for allowance. Prompt reconsideration and allowance are respectfully requested.

Respectfully submitted,

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